

AUSTRALIAN CUMACEA. No. 16¹

THE FAMILY NANNASTACIDAE²

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Fig. 1-12.

THE Nannastacids dealt with in this paper are mostly from Western Australia, where the material was secured by Dr. A. G. Nicholls and Mr. G. P. Whitley. As a result of these collections, all made by means of submarine light traps³, fourteen species of the family are added to the Western Australian list, which now stands as follows:

Genus NANNASTACUS Bate.

<i>nasutus</i> Zimmer.	<i>inflatus</i> Hale.
<i>nasutus</i> var. <i>camelus</i> Zimmer.	<i>subinflatus</i> Hale.
<i>inconstans</i> Hale.	<i>nichollsi</i> sp. nov.
<i>asper</i> Hale.	<i>vietus</i> sp. nov.

Genus SCHIZOTREMA Calman.

<i>aculeata</i> Hale.	<i>resima</i> sp. nov.
<i>leopardina</i> sp. nov.	

Genus CUMELLA Sars.

<i>gibba</i> Zimmer.	<i>michaelseni</i> Zimmer.
<i>cyclaspoides</i> Zimmer.	<i>similis</i> Fage.
<i>hispida</i> Calman.	<i>cana</i> Hale.

Genus CAMPYLASPIS Sars.

<i>unisulcata</i> Hale.	<i>minor</i> Hale.
cf. <i>similis</i> Hale.	

¹ For No. 15 see *Rec. S. Aust. Mus.*, IX, 1949, pp. 107-125, fig. 1-9.

² See also *Rec. S. Aust. Mus.*, VIII, 1945, pp. 145-218, fig. 1-49.

³ Sheard, *Rec. S. Aust. Mus.*, VII, 1941, pp. 11-14, fig. 1.

Also described are a new species of *Cumellopsis*, the first member of the genus to be noted in the Southern Hemisphere, and the hitherto unknown female of *Campylaspis echinata* Hale.

Genus NANNASTACUS Bate.

Seven species, two of which are new, are available from Western Australia.

NANNASTACUS NASUTUS Zimmer.

Nannastacus nasutus Zimmer, 1914, p. 184, fig. 11-12; Hale, 1945, p. 148, fig. 1.

Specimens have been taken by G. P. Whitley at the type locality, Shark Bay (lat. 25.30 S.), and several places to the north of this, on the Western Australian coast. As previously noted (Hale, *ut supra*, p. 150) Zimmer's var. *camelus* appears to be a southern form of the species.

NANNASTACUS INCONSTANS Hale.

Nannastacus inconstans Hale, 1914, p. 150, fig. 2-3.

More than 350 males were taken by A. G. Nicholls at Garden Island, Western Australia; both forms occur here, the granulate or cristate one, and that with inflated branchial regions.

Males were taken also at Shark Bay by G. P. Whitley.

NANNASTACUS ASPER Hale.

Nannastacus asper Hale, 1914, p. 154, fig. 6-7.

Males collected at Esperance Bay, Western Australia, by A. G. Nicholls extend the known distribution of the species, formerly recorded from Tasmania and South Australia.

NANNASTACUS INFLATUS Hale.

Nannastacus inflatus Hale, 1945, p. 159, fig. 10-11.

Many specimens, most of which are males, were collected by A. G. Nicholls and G. P. Whitley from the following localities: Esperance Bay, Rottnest Island, Garden Island, Shark Bay, Geraldton, Houtman Abrolhos, Mary Anne Group (lat. 22.00 S. to 32.50 S.).

NANNASTACUS SUBINFLATUS Hale.

Nannastacus subinflatus Hale, 1945, p. 162, fig. 12-13.

Material of this species was collected from all the Western Australian localities given for *inflatus* and was taken also on the eastern side of North-West Cape.

NANNASTACUS NICHOLLSI sp. nov.

Adult female. Carapace one-third of total length of animal and almost twice as long as pedigerous somites together; it is slightly depressed and its depth is more than two-thirds its length; at the rear is a rather prominent median elevation, below and behind the eye is a tumidity, seated in a shallow depression, while below the posterior elevation is a smaller hollow; between the two depressions is a slight tumidity. Pseudorostrum one-seventh of length of carapace, directed very obliquely upwards; lobes meeting for whole length, and finely serrate in front. Antero-lateral margin shallowly concave; antero-lateral angle produced as a tooth, above which are three smaller teeth; inferior margin serrate anteriorly.

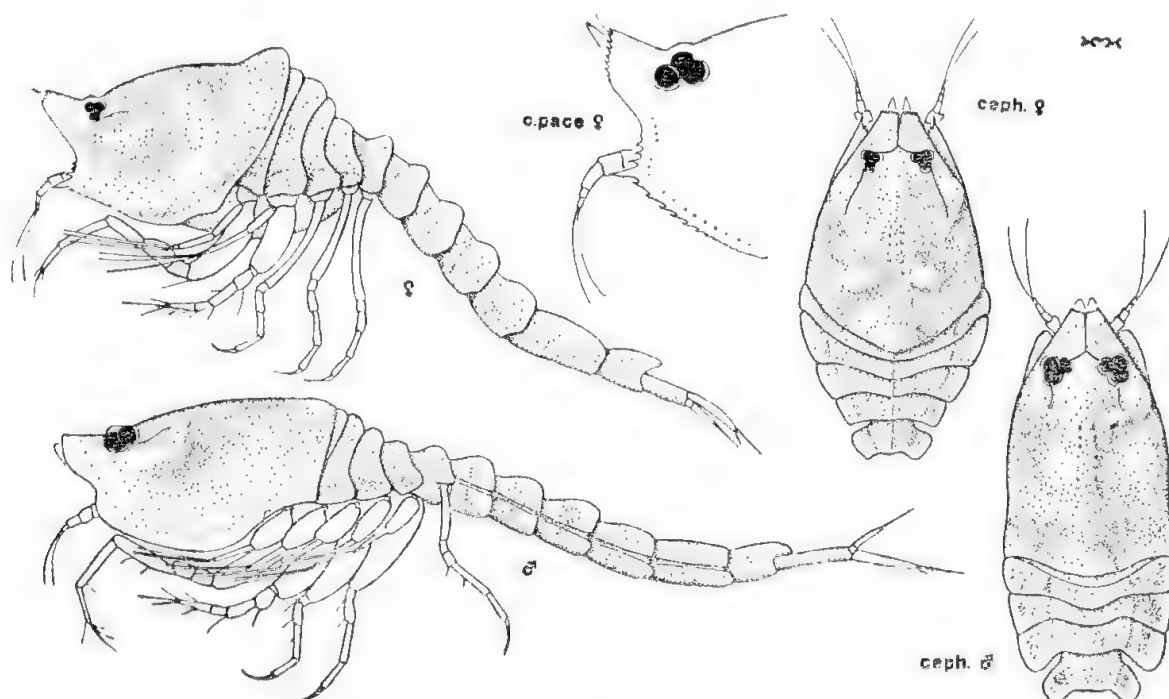


Fig. 1. *Nannastacus nichollsi*, types female and male; lateral views and (ceph.) cephalothorax from above ($\times 32$); c. pace, anterior part of carapace ($\times 45$).

All pedigerous somites exposed, each with a fine median longitudinal dorsal carina and with pleural parts swollen but not greatly expanded fore and aft.

Pleon equal in length to cephalothorax; first somite (unlike remaining abdominal somites) with a fine median carina on back, which, like that of last pedigerous somite, is raised; second to fourth somites successively less tumid dorsally; fifth half as long again as either fourth or telsonic somites; the last-named is widest at the rear, with posterior margin rounded, and is barely longer than wide.

Second and third peduncular joints of first antenna subequal in length, together equal in length to first; flagellum with two joints of equal length, together as long as last segment of peduncle.

Third maxilliped without exopod.

First peraeopod with propodus equal in length to carpus and twice as long as dactylus; ischium with an inner apical tooth. Second peraeopod with ischium distinct; basis a little shorter than rest of limb, the joints of which are as in *sheardi* but longer terminal dactylar spine is longer than propodus and dactylus together.

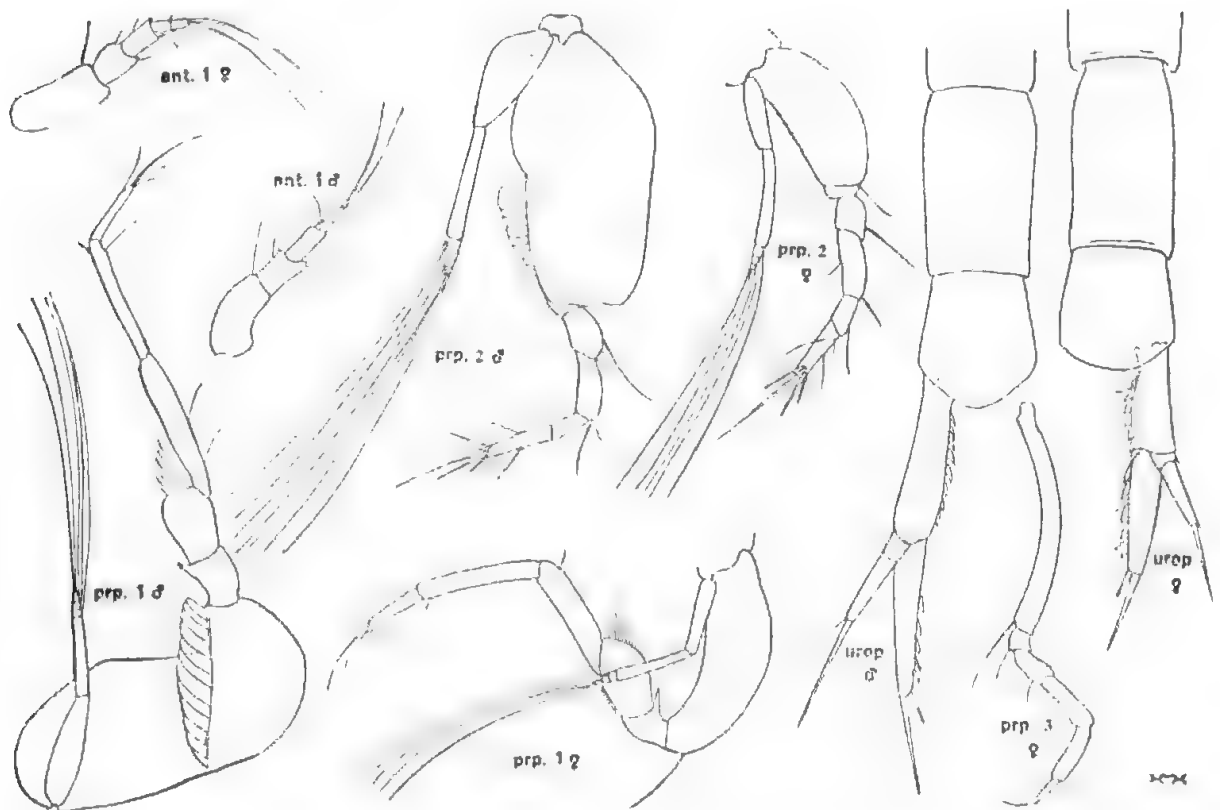


Fig. 2. *Nannastacus nichollsi*, type female and paratype male; ant. 1, first antenna; prp. 1-3, first, second and third peraeopods; urop., uropod with fifth pleon and telsonic somites (all $\times 112$).

Peduncle of uropod shorter than telsonic somite and shorter than endopod without terminal spine; inner edge with hyaline serrations; exopod two-thirds as long as endopod, and little longer than terminal spine, which reaches well beyond distal end of endopod; endopod equal in length to telsonic somite, with serrate inner margin, and with two very unequal stout terminal spines, the longer of which is two-thirds as long as the ramus.

Colour white, without pigmentation. Length 1.4 mm.

Adult male. Integument, like that of female, without granulation.

Carapace more than one-third of total length of animal, slightly depressed, and nearly twice as long as deep; the sculpture, as described for the female, is present but is only faintly defined. Pseudorostrum one-sixth of length of carapace, not upturned. Antennal angle rounded and without spines; inferior margin finely crenulate anteriorly. Antero-lateral margin shallowly concave.

Pedigerous somites together almost half as long as carapace, first with pleural parts concealed; second to fourth with pleural portions slightly expanded.

Pleon a little shorter than cephalothorax, with first three somites, like last pedigerous somite, slightly tumid dorsally; fifth one-third longer than either fourth or telsonic somites; the latter is distinctly longer than wide.

First peraeopod with carpus a little longer than propodus and more than twice as long as dactylus; ischium with inner distal tooth as in female.

Basis of second peraeopod larger than in female; remaining joints of same proportions but longest daetylar spine relatively shorter.

Peduncle of uropod barely one-fourth as long again as telsonic somite, scarcely longer than endopod, and with inner margin serrate; exopod less than two-thirds as long as endopod and with its terminal spine longer than the ramus; endopod with two unequal distal spines, preceded by two short spines and a row of serrations on inner margin; longest terminal spine equal in length to exopod.

Colour: carapace brown, with a border of pale yellow along inferior and anterior margins; second to fifth pedigerous somites brown, margined all around with yellow; pleon somites yellow with indefinite transverse brown markings. Length 1.5 mm.

Loc. Western Australia: Garden Island, Carcening Bay, 3 fathoms (A. G. Nicholls, submarine light, Nov. 1946). Types in South Australian Museum, Reg. No. C.3186 and 3135.

A single female and several males of this Nannastacid were taken. *N. nichollsi* resembles *sheardi* (Hale, 1945, p. 156, fig. 8-9) in some respects. It agrees in the relatively long pseudorostrum and in the proportions of the peraeopods, but differs as follows:

FEMALES.

Carapace not granulate but with a well-marked tumidity situated below eye lobe and seated in a shallow depression; a similar but smaller depression below the median elevation at rear of carapace. Third maxilliped without exopod. Uropod with peduncle shorter than endopod and with exopod two-thirds as long as endopod (not including terminal spines in length of either ramus)

. *nichollsi* sp. nov.

Carapace granulate and not sculptured as above. Third maxilliped with exopod. Uropod with peduncle much longer than endopod and with exopod three-fourths as long as endopod *sheardi* Hale

MALES.

Carapace not granulate but with slight depressions and tumidities. Uropod with peduncle barely one-fourth as long again as telsonic somite and with exopod less than two-thirds as long as endopod (not including terminal spines) *nichollsi* sp. nov.

Carapace granulate and not sculptured as above. Uropod with peduncle more than one-third as long again as telsonic somite and with exopod four-fifths as long as endopod *sheardi* Hale.

NANNASTACUS VIETUS sp. nov.

Adult male. Integument strongly calcified; back and sides of cephalothorax and pleon granulate and with scattered short hairs.

Carapace depressed, more than one-third as wide again as deep, and twice as long as deep; it is more than one-third of total length of the animal and two-thirds as long again as pedigerous somites together; behind each eye is a longitudinal tuberculate ridge, extending almost to hinder margin of carapace and most prominent along edge of ocular lobe; an outstanding carina extends back from antero-lateral region, subparallel to the dorso-lateral ridge; on each side the area between the two carinae is depressed; on the mid-line, in anterior half, is a low tuberculate ridge, followed by a median gutter and there is a low median tumidity at rear end. Antero-lateral margin shallowly concave; antero-lateral angle with a spine, behind which inferior margin is finely serrate. Pseudorostrum short, obliquely truncated, so that the lobes appear as partly open above and completely closed below; respiratory siphons short and directed upwards.

Pleural parts of first pedigerous somite concealed; pleural parts of second to fifth somites margined with flattened hyaline "spines" with rounded apices; dorsum of these somites with a few tubercles larger than the general granulation; in addition the last two pedigerous somites each bear a pair of prominent globular, stalked tubercles, of glassy transparency, on the back.

Pleon not much more than three-fourths as long as cephalothorax; there is a row of lateral hyaline spines on each somite, those of first to fifth situate on the antennal groove; first two somites with a pair of blunt spines, as well as a few tubercles, on dorsum; fifth somite nearly half as long again as telsonic somite, which is widest at distal third of length, is as broad as long, is angularly rounded at distal end and somewhat produced over bases of uropods.

First joint of peduncle of first antenna equal in length to second and third segments together; third barely longer than second and one-third as long again as flagellum, the first joint of which is longer than second; accessory flagellum relatively large, single-jointed.

Third maxilliped with propodus curved, one-third as long again as carpus, which is slightly longer than merus; basis equal in length to rest of limb.

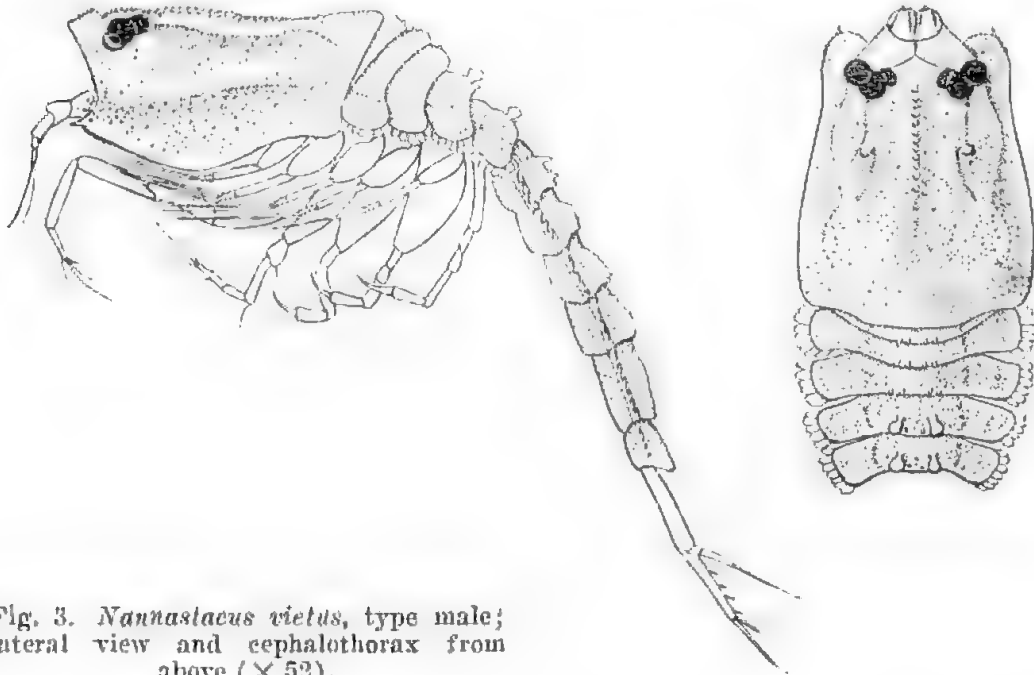


Fig. 3. *Nannastacus vietus*, type male; lateral view and cephalothorax from above ($\times 52$).

Basis of first peraeopod three-fifths as long as rest of limb; ischium with a strong outer distal spine; propodus a little shorter than carpus and less than twice as long as dactylus, which is shorter than its stoutest apical seta.

Basis of second peraeopod distinctly longer than rest of limb; ischium indistinct; merus two-thirds as long as carpus, which is not much shorter than propodus and dactylus together; dactylus half as long again as propodus and with longest terminal spine as long as propodus and dactylus together.

Third and fourth peraeopods with basis a little shorter than rest of limb, the joints of which are short, stout, and subequal in length, the propodus a little longer than the others.

Fifth peraeopod with basis half as long as combined lengths of remaining joints; ischium and merus subequal in length, each a little shorter than propodus; carpus one-third as long again as propodus and little longer than dactylus.

Peduncle of uropod almost half as long again as telsonic somite, somewhat dilated at distal end, and furnished with some non-articulated spines, of which three on inner face in proximal half are conspicuous; endopod equal in length to peduncle, armed with four short spines on inner margin and with two unequal stout terminal spines, the longer finely serrate in distal half and not much shorter than the ramus, while the shorter spine is distinctly less than half as long as this and bears minute lateral setae in proximal half; exopod four-sevenths as long as endopod and with a long slender distal spine, twice as long as the ramus.

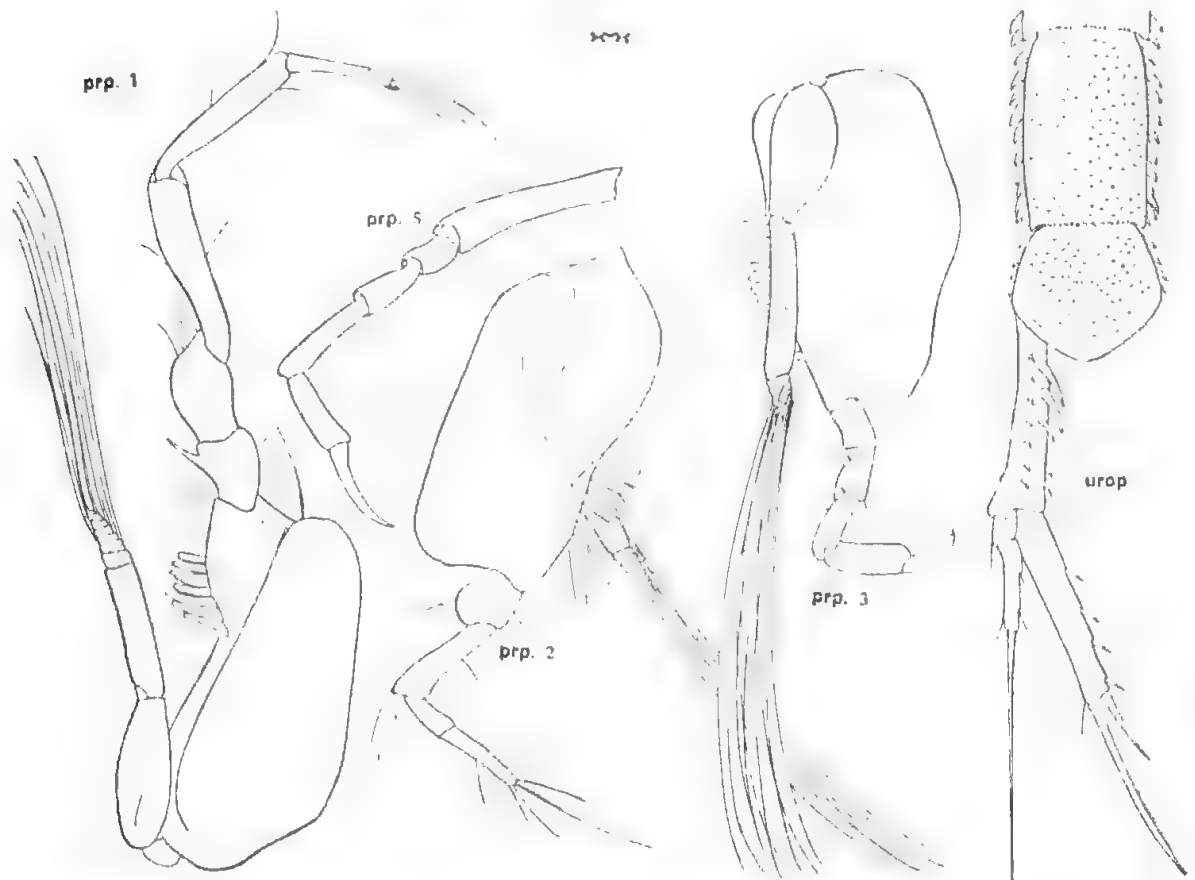


Fig. 4. *Nannastacus vietus*, type male; prp. 1-3 and 5, first, second, third and fifth peraeopods; urop., uropod with fifth pleon and telsonic somites (all $\times 120$).

Colour: carapace dark grey with margins and ridges pale yellow. Pedigerous somites and pleon greyish. Appendages pale yellow. Length 1.7 mm.

Loc. Western Australia: Garden Island, Careening Bay, 3 fathoms (type loc., A. G. Nicholls, submarine light, Nov. 1946); Mary Anne Group, 3½ fathoms (G. P. Whitley, submarine light, Nov. 1945). Type in South Australian Museum, Reg. No. C.3137.

A male from the Mary Anne Group, on the north-western Australian coast, is 1.5 mm. in length and differs from the Garden Island males in having the ridges of the carapace, particularly the lateral one, not quite so pronounced.

N. vietus, like *nichollsi*, falls arbitrarily next to *sheardi* in the author's key to the males of the species of the genus (Hale 1945, p. 146); it differs, however, in several prominent features, notably the sculpture of the carapace, the shorter pseudorostrum, the short and stout fossorial peraeopods and the character of the uropod. It is related to *stephenseni* (Fage, 1945, p. 201, fig. xxiii, male only) but in the last-named the telsonic somite is of distinctive shape, the uropods have different armature, with the peduncle shorter and the exopod (without terminal spine) longer in relation to the endopod, etc.

Genus SCHIZOTREMA Calman.

With the two species described below as new, nine forms are now referable with certainty to this genus. *S. depressa* Calman has been taken in South Australia (Hale, 1937, p. 74) so that four of the species occur on Australian coasts.

KEY TO SPECIES OF *SCHIZOTREMA*.

1. Peduncle of uropod much longer than endopod *calmani* Stebbing
 Peduncle of uropod much shorter than endopod 2
2. Carapace broad and depressed. Peduncle of uropod longer than telsonic
 somite *depressa* Calman
 Carapace not or little depressed. Peduncle of uropod much shorter than
 telsonic somite 3
3. Exopod of uropod half, or almost half, as long as endopod (not including
 terminal spines in length of either ramus) 4
 Exopod of uropod much less than half as long as endopod 6
4. Each pleon somite with at least one pair of outstanding dorsal spines
 (in both sexes) *aculeata* Hale
 Pleon somites with at most inconspicuous spines 5
5. Surface of body with numerous small spines and tubercles; antero-lateral
 angle of carapace produced as a stout cylindrical process *bifrons* Calman
 Surface of body for the most part smooth; antero-lateral angle of carapace
 produced as a slender tooth *sordida* Calman
6. At least some of the pedigerous and pleon somites with conspicuous dorsal
 spines 7
 Dorsum of pedigerous and pleon somites with at most inconspicuous
 spinules 8
7. Carapace with back and sides spiny, and with antero-lateral angle broad,
 not at all downbent *resima* sp. nov.
 Carapace not spiny and with antero-lateral angle produced and strongly
 downbent *bidens* Fage

8. Exopod of uropod one-third as long as endopod (not including terminal spines in lengths); spine of exopod reaching to distal end of endopod. Fifth pleon somite subequal in length to telsonic somite *macrodactylus* Fage
 Exopod of uropod one-fourth as long as endopod and with its terminal spine reaching beyond distal end of endopod. Fifth pleon somite distinctly longer than telsonic somite *leopardina* sp. nov.

SCHIZOTREMA ACULEATA Hale.

Schizotrema aculeata Hale, 1945, p. 168, fig. 16 (ref.)

This species proves to be not uncommon in south-western Australia. At Garden Island it was taken in company with *S. leopardina*, but the smaller size and characteristic armature enabled the species to be separated with ease. Males are available also from North-West Cape.

SCHIZOTREMA LEOPARDINA sp. nov.

Adult male. Integument well calcified. Cephalothorax and pleon with no conspicuous armature, but with minute, rather scattered, short spines; carapace with a few short hairs.

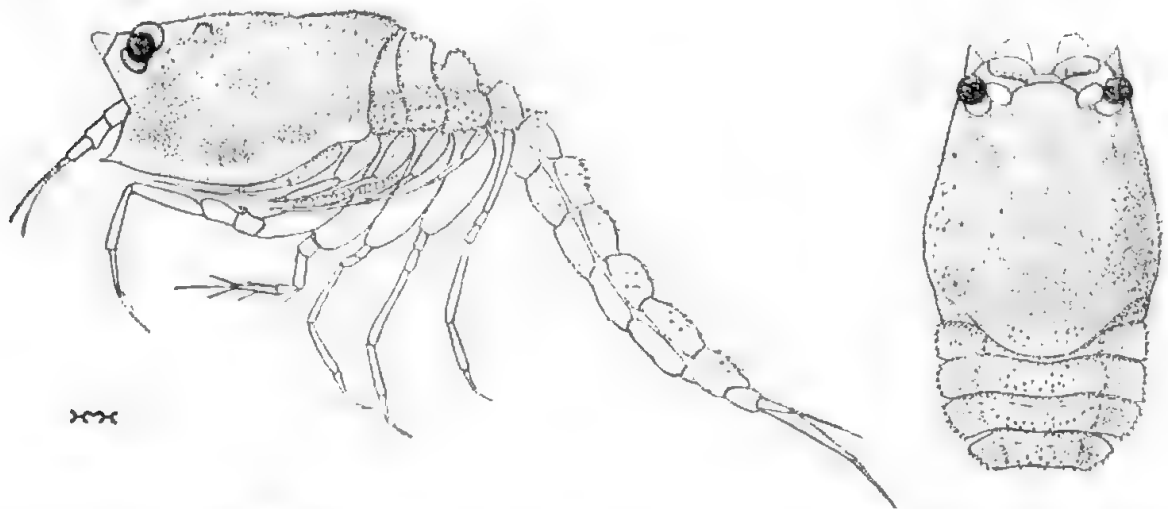


Fig. 5. *Schizotrema leopardina*, type male; lateral view and cephalothorax from above ($\times 45$).

Carapace depressed (one-third as wide again as deep), three-fourths as long again as deep, twice as long as exposed pedigerous somites together and a little less than two-fifths of total length of animal; at the rear it is slightly raised dorsally and is produced backwards to partly cover the dorsum of the first free pedigerous somite; the branchial regions are somewhat swollen, delimited above by a shallow groove; to the rear of each eye there is a low conical elevation; antero-lateral angle produced and acute.

First and second free pedigerous somites subequal in width, neither as wide as the carapace.

Fifth pleon somite distinctly longer than telsonic somite, which is as long as wide, and has no terminal spine.

First antenna with first joint of peduncle longer than second and third joints together; the two-jointed flagellum is fully as long as the distal joint of peduncle.

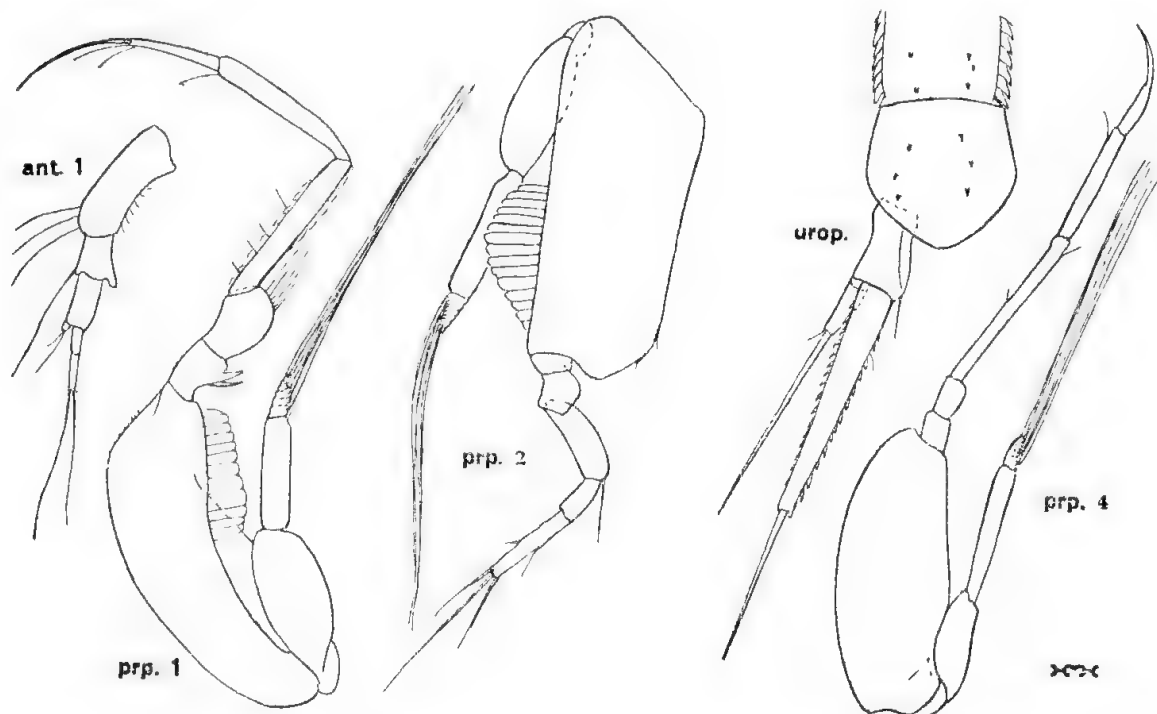


Fig. 6. *Schizotrema leopardina*, paratype male; ant. 1, first antenna; prp. 1, 2 and 4, first, second and fourth peraeopods; urop., telsonic somite and uropod (all $\times 90$).

Lateral margins of ischium and merus of third maxilliped with strong, spine-like serrations.

Basis of first peraeopod two-thirds as long as rest of limb and with external lamellate spines; propodus a little shorter than carpus and nearly twice as long as dactylus; ischium with two or three curved spines on outer margin.

Basis of second peraeopod longer than rest of limb and furnished with lamellate spines; carpus as long as dactylus and twice as long as propodus; longest terminal dactylar spine longer than propodus and dactylus together.

Peduncle of uropod distinctly more than half as long as telsonic somite and two-fifths as long as endopod, exclusive of its terminal spine; exopod two-thirds as long as peduncle, one-fourth as long as endopod and with its terminal spine reaching a little beyond distal end of endopod; terminal spine of endopod two-thirds as long as the ramus.

Colour pale yellow with large conspicuous patches of brown pigment on carapace as shown in fig. 5; the lower edge of the carapace is broadly margined with yellow. Lateral parts of pedigerous somites brown. Peduncle of exopods of third maxillipeds and pereopods brown, margined with the pale ground colour. Pleon and rest of appendages pale. Length 1.85 mm.

Loc. Western Australia: Garden Island, Careening Bay, 3 fathoms (type loc., A. G. Nicholls, submarine light, Nov., 1946); North-West Cape, Vlaming Head, 2 fathoms, on sand (G. P. Whitley, submarine light, Nov. 1945). Type in South Australian Museum, Reg. No. C.3138.

Over three hundred specimens, all males, were taken at Garden Island by Dr. Nicholls during the night of November 26th-27th. *S. aculeata* Hale was taken in the same locality but the new species is distinguished by the slightly larger size, the absence of pronounced body armature, the longer fifth pleon somite, the different proportions of the terminal joints of first and second pereopods, and of the uropod, where the exopod is relatively much shorter (half as long as endopod in *aculeata*, only one-fourth in *leopardina*). Above all the striking colour pattern enables the new species to be distinguished at a glance from all other Australian Nannastacids; the bold pigment patches persist in spirit material.

SCHIZOTREMA RESIMA sp. nov.

Adult female. Integument well calcified. Dorsum and sides of cephalothorax with rather large spines, many of which bear a brush of minute setae in distal third. Pleon somites with dorsal spines and with hyaline lateral serrations.

Carapace with branchial regions swollen, so that it is fully as wide as deep; it is robust, being only one-third as long again as deep, is twice as long as the pedigerous somites together and two-fifths of total length of animal; the pseudorostral lobes are spinose inferiorly, are rather prominent and upturned, and the rostral siphons are long; the antero-lateral angle is well produced and is spinose.

First pedigerous somite exposed, but short, particularly on dorsum; this, like second and third somites, is as wide as carapace, the fourth and fifth being abruptly narrower.

Fifth pleon somite equal in length to telsonic somite, which has dorsal spines but no spine at hinder margin and is fully as wide as long.

First antenna with first joint of peduncle as long as second and third segments together.

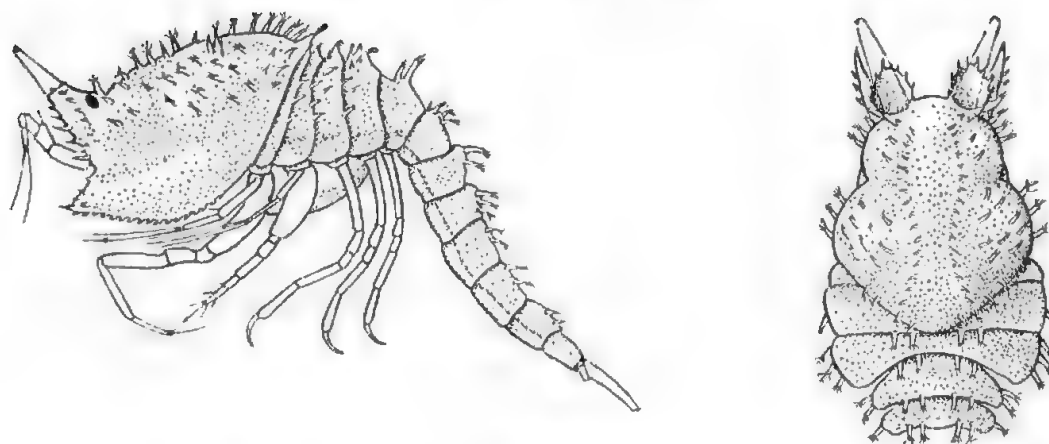


Fig. 7. *Schizotrema resima*, type female; lateral view and cephalothorax from above ($\times 60$).

Third maxilliped with well-developed exopod.

First pereopod short, the basis only half as long as rest of limb; carpus and propodus equal in length, each twice as long as dactylus.

Basis of second pereopod subequal in length to rest of limb; carpus as long as dactylus and less than twice as long as propodus; longest dactylar spine almost as long as dactylus and propodus together.

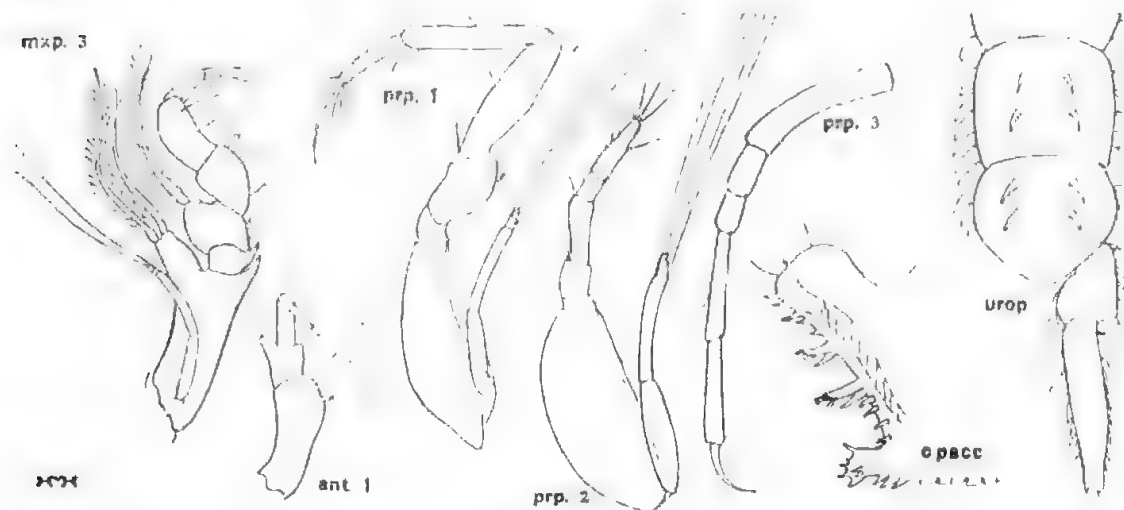


Fig. 8. *Schizotrema resima*, type female; ant. 1 and mxp. 3, first antenna and third maxilliped; prp. 1-3, first, second and third pereopods; urop., uropod with fifth pleon and telsonic somites (all $\times 125$).

Peduncle of uropod distinctly more than half as long as telsonic somite and less than half as long as endopod, the terminal spine of which is missing; exopod two-sevenths as long as endopod and with terminal spine missing.

Colour uniformly white. Length 1.15 mm.

Loc. Western Australia: Garden Island, Careening Bay, 3 fathoms (A. G. Nicholls, submarine light, Nov., 1946). Type in South Australian Museum, Reg. No. C.3138.

Genus CUMELLA Sars.

Two of the Western Australian species described by Zimmer (1914, pp. 181-182) viz. *gibba* and *cyclaspoides* are not represented in the material now in hand, notwithstanding the fact that their type locality, Shark Bay, was well combed by G. P. Whitley in 1945.

CUMELLA HISPIDA Calman

Cumella hispida Calman, 1911, p. 347, pl. xxxii, fig. 11-14; Zimmer, 1914, p. 179; Fage, 1945, p. 209, fig. xxxi; Hale, 1945, p. 176, fig. 21.

A single male from the Mary Anne Group, north-western Australia (G. P. Whitley, 3½ fathoms, Nov. 1945) agrees with the males previously described from Queensland (Hale *ut supra*, urop. ♂ and prp. 5 ♂). Zimmer records the species from Western Australia—Shark Bay and Rottnest Island.

CUMELLA MICHAELSENI Zimmer.

Cumella michaelсени Zimmer, 1914, p. 179, fig. 4-5.

A male 2.5 mm. in length, and taken by G. P. Whitley at the type locality (Shark Bay, Western Australia, 1½ fathoms, Nov. 1945), resembles in general appearance the males of both *hispida* Calman and *turgidula* Hale.

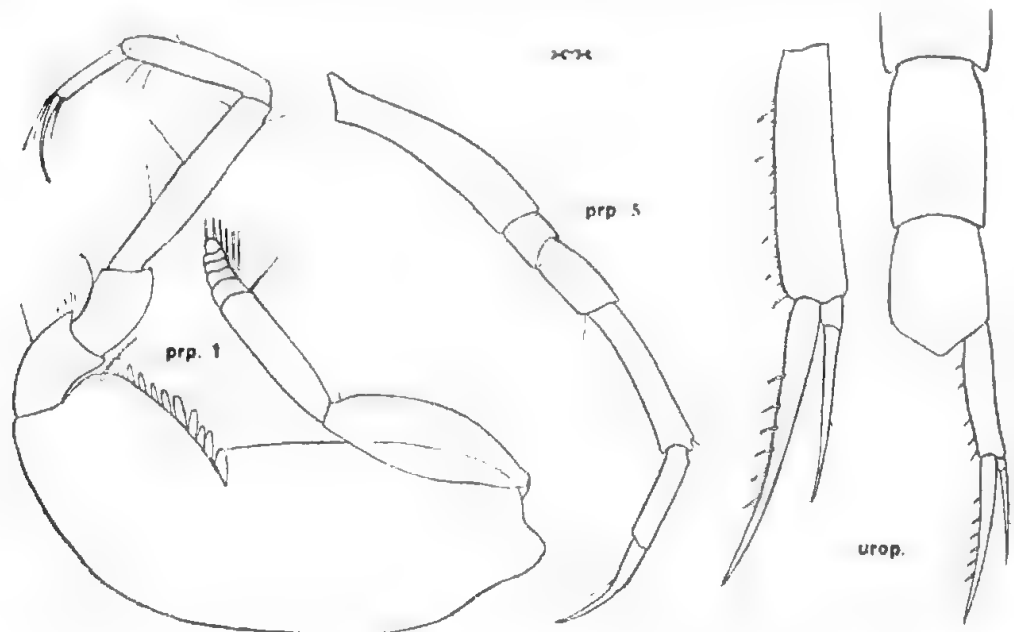


Fig. 9. *Cumella michaelсени*, adult male; prp. 1 and 5, first and fifth pereopods ($\times 120$); urop., uropod ($\times 120$); uropod with fifth pleon and telsonic somites ($\times 54$).

In a key previously submitted (Hale, 1945, p. 171) it was not possible to separate the males of *hispidula* and *michaelseni*, only the female of the last-named being then known. Though distinguished by relatively trivial characters, adult males of the three species are separable thus:

1. Terminal spines of rami of uropods distinctly marked off. Peduncle of uropod slightly longer than endopod including terminal spine *turgidula* Hale
No demarkation between rami of uropods and their terminal spines.
Peduncle of uropod five-sixths as long as endopod 2
2. Carpus of fifth peraeopod twice as long as propodus. Exopod of uropod more than three-fourths as long as endopod *hispidula* Calman
Carpus of fifth peraeopod only half as long again as propodus. Exopod of uropod less than three-fourths as long as endopod .. *michaelseni* Zimmer

CUMELLA SIMILIS Fage.

Cumella similis Fage, Feb. 1945, p. 211, fig. xxxiii-xxxiv.

Cumella munroi Hale, June 1945, p. 171, fig. 17-18.

I can find no valid differences between the Southern Queensland material recorded as *munroi* and that described at about the same time by Fage from Annam.

The species proves to be not uncommon at Garden Island in Western Australia, where 200 males and 3 females were collected by A. G. Nicholls.

CUMELLA CANA Hale.

Cumella cana Hale, 1945, p. 172, fig. 18 (syn.).

A single not fully adult male was taken at Garden Island.

GENUS CUMELLOPSIS Calman.

Cumellopsis Calman, 1904, p. 28, and 1906, p. 418; Stebbing, 1913, p. 177; Hansen, 1920, p. 32.

CUMELLOPSIS AUSTRALIENSIS sp. nov.

Female with developing marsupium. Integument thin but well calcified, opaque and brittle; armature of appendages hyaline. Carapace with strong imbricate surface patterning, rest of body obscurely granulate.

Carapace one-third of total length of animal, slightly depressed and fully half as long again as deep; a low, irregular, median dorsal double carina runs from ocular lobe to a marked tumidity at hinder end; the last-named elevation is minutely bifid at the proximal end and at its front there is a pair of tubercles; just posterior to the termination of each pseudo-rostral suture there is a shallow

pit; each side of the carapace is shallowly indented for the greater part of length of carapace and the hollow is margined below by a sharply defined, horizontal, carina arising at the antero-lateral angle and terminating at the postero-lateral angle, which is produced backwards to form a small subtriangular lobe; the branchial regions are somewhat swollen and each is traversed by a fine carina, which arises at the posterior end of lateral hollow and curves upwards to meet the median posterior swelling; outline of back as seen from the side only slightly arched from posterior tumidity to ocular lobe, sinuate because of



Fig. 10. *Cumellopsis australiensis*, type female; lateral view and cephalothorax from above ($\times 36$).

the irregularity of dorsal carina; the rear end of carapace overhangs the pedigerous somites only slightly. Pseudorostrum abruptly upturned, the lobes meeting for a distance equal to almost one-seventh of length of carapace; each is truncate and slightly concave in front when viewed either from above or from the side. Ocular lobe moderately large, tumid, more than twice as broad as long and without apparent lenses. Antero-lateral margin slightly concave; antero-lateral angle prominent, subacutely rounded, and furnished with a blunt hyaline tubercle and two or three spines.

Pedigerous somites together distinctly more than half as long as carapace; first somite short, almost smooth and with pleural parts concealed; second to third subequal in length, with hinder edges finely crenulate (in part almost spinulose) and with a pair of feeble dorsal ridges, each of which terminates at hinder margin in a small triangular projection; the postero-lateral angles of these three somites are subacutely produced backwards; fifth somite slightly

longer than fourth; with a pair of minute projections at middle of hinder margin, a feebly serrate dorso-lateral carina on each side, and with postero-lateral angles as in preceding somites, but less acute.

Pleon equal in length to cephalothorax; first three somites subequal in length, with an elevated, feebly serrate dorso-lateral carina on each side; seen from above these ridges curve outwards and so diverge rather widely at the rear; fourth somite also with a pair of dorso-lateral ridges for whole length, but here they are parallel; fifth somite nearly twice as long as fourth, with a median dorsal carina, crenulate and almost cristiform, and projecting a little beyond posterior margin; the first five somites bend inwards rather abruptly infero-laterally, so producing a distinct though rounded angle between the sides and the somewhat flattened venter; telsonic somite about as long as fourth, with a low median carina on anterior half of dorsum, and with posterior margin bisinuate, rounded medianly; the telsonic part of the somite overhangs the bases of the uropods.

First antenna geniculate between the wide first and second segments of peduncle; first joint twice as long as second and third joints together; third only half as wide, and not much more than half as long, as second; flagellum little longer than third peduncular segment, composed of two joints, the first longer than second; accessory lash single-jointed, less than half as long as main flagellum.

Third maxilliped (like peraeopods) with transparent marginal teeth as shown in figure; basis equal in length to remaining joints together, not at all expanded distally and with outer subapical setae very long; carpus fully half as long again as propodus, which is twice as long as dactylus.

First peraeopod short, the propodus of extended limb reaching only to antero-lateral angle of carapace; basis less than two-thirds as long as rest of limb; carpus two-thirds as long again as propodus, which is almost twice as long as dactylus.

Second peraeopod three-fourths as long as first; basis a little shorter than rest of limb; ischium distinct; merus and carpus broad, subequal in length; each a little shorter than the tapering dactylus, which is distinctly more than twice as long as propodus.

Basis of third peraeopod not much shorter than rest of limb, in second distinctly shorter than this, and in fifth not much more than half the combined lengths of remaining joints. Carpus of posterior limbs nearly twice as long as propodus, and considerably longer than ischium and merus together; dactylus longer than propodus, slender and tapering in distal half; the single distal propodal seta is thin and does not reach tip of dactylus; other setae of third to fifth legs insignificant.

Peduncle of uropod carinate (or rather roof-shaped) dorsally, about as long as fifth pleon somite and not much shorter than the equal rami, including the terminal spines in the length of the latter; the distal spines are not distinctly marked off and the edges of the rami are in part serrate.

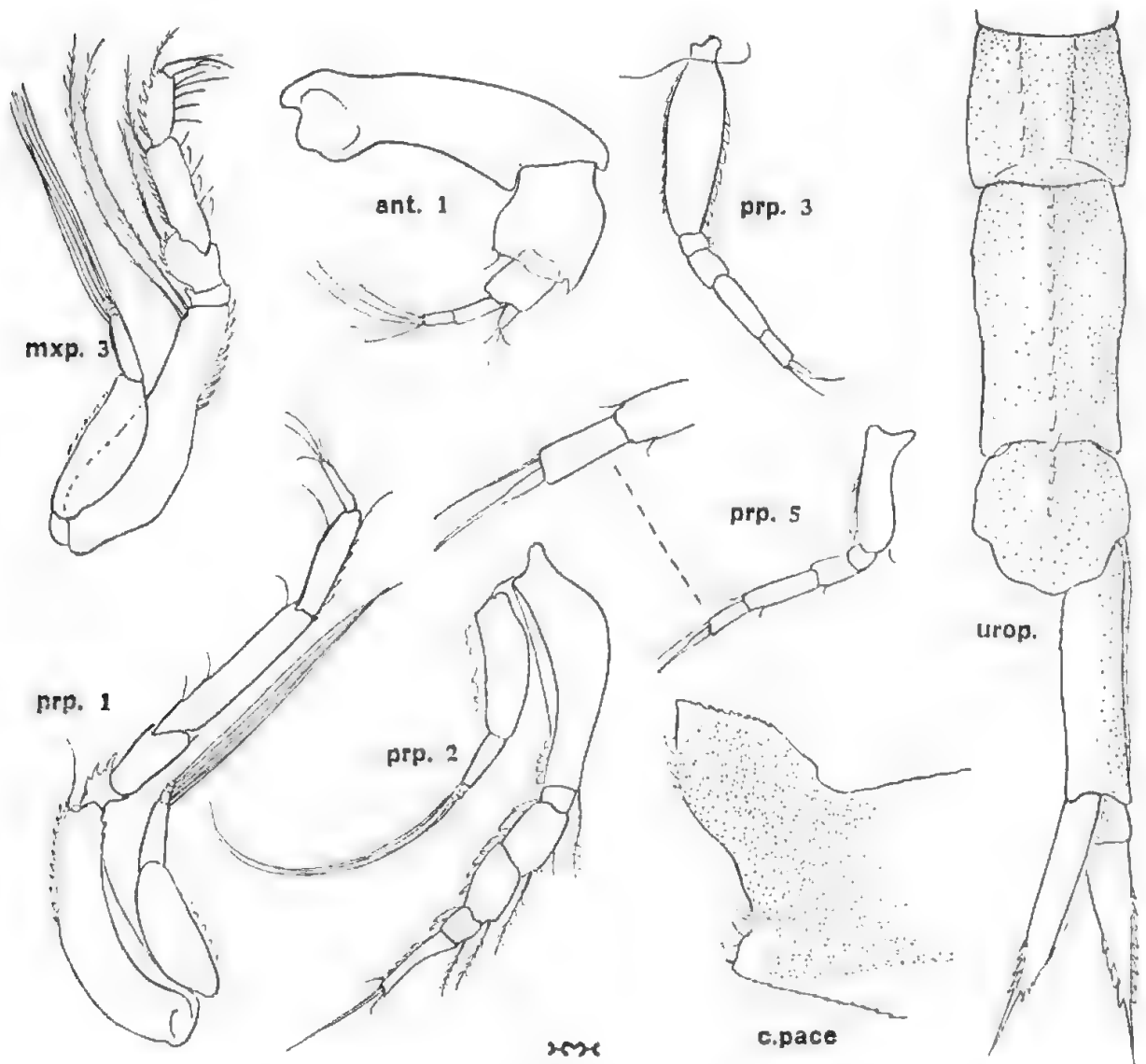


Fig. 11. *Cumellopsis australiensis*, type female; c.pace, anterior part of pseudorostral lobe ($\times 77$); ant. 1, first antenna ($\times 170$); mxp. 3, third maxilliped ($\times 77$); prp. 1-3 and 5, first, second, third and fifth peraeopods ($\times 77$; distal joints of fifth leg, $\times 170$); urop., uropod with fourth, fifth and telsonic somites of pleon ($\times 77$).

Colour white, without trace of pigmentation anywhere. Length 3.0 mm.

Loc. New South Wales: off Ulladulla, 80 metres, on coarse sand (K. Sheard, Jan. 1944). Type in South Australian Museum, Reg. No. C.2836.

This is the first member of the genus to be recorded for the Southern

Hemisphere. It differs in a number of important features from the only other two species of the genus, notably in the marked dorsal elevation at posterior end of carapace, the sculpture, the short first peraeopods and the equal rami of the uropod.

Genus CAMPYLASPIS Sars.

It would seem from the large number of Australian Cumacea examined to date that this genus is poorly represented on the southern and western coasts. Off the eastern and Tasmanian shores thirteen species have been recorded (Foxon, 1932, p. 293 and Hale, 1945, p. 180 *et. seq.*), two are known to occur in South Australia (Hale, 1945, pp. 187 and 192), while only four specimens, representing three species, appear amongst the thousands of Western Australian specimens now in hand.

C. echinata Hale, was described from the male only; the adult female has since been found not far from the type locality in New South Wales and details of this sex are given below.

Two described species of the genus are not included in the key previously submitted by the writer (Hale, 1945, p. 181). These are *squamifera* Fage (1929, p. 19, pl. ii, fig. 38-45—omitted from Zoological Record), and *tubulata* Fage (1945, p. 215, fig. 36-38). *C. squamifera* would be separated in the key from *globosa* Hansen by the character of the merus of the third maxilliped and the shorter peduncle of the uropod. *C. tubulata* would fall near *unisulcata* and differs in having (1) the merus of the third maxilliped shorter instead of longer than the carpus and propodus together; (2) the merus of the first peraeopod shorter than the carpus.

CAMPYLASPIS UNISULCATA Hale.

Campylaspis unisulcata Hale, 1945, p. 187, fig. 27-28.

A single young male from Rottnest Island (A. G. Nicholls, Nov. 1945) is referred here with some doubt; it is only 2.8 mm. in length and the appendages are not fully developed. Previously recorded from South Australia and Tasmania.

CAMPYLASPIS MINOR Hale.

Campylaspis minor Hale, 1945, p. 197, fig. 35-36.

Two examples from Shark Bay and North-West Cape (G. P. Whitley, Nov. 1945).

CAMPYLASPIS cf. SIMILIS Hale.

Campylaspis similis Hale, 1945, p. 186, fig. 26.

A juvenile male from the Mary Anne Group (G. P. Whitley, 3½ fathoms, Nov. 1945) apparently is referable to either *thompsoni* Hale or *similis* Hale; it is so young, however, that certain identification is not possible.

CAMPYLASPIS ECHINATA Hale.

Campylaspis echinata Hale, 1945, p. 204, fig. 41-42 (male only).

Adult female. The carapace, pedigerous and pleon somites, and the uropods bear numerous spiniform projections as in the male; these have rounded tips, mostly slightly dilated and in a few cases bifid; the shallow lateral depression is somewhat larger than in male.

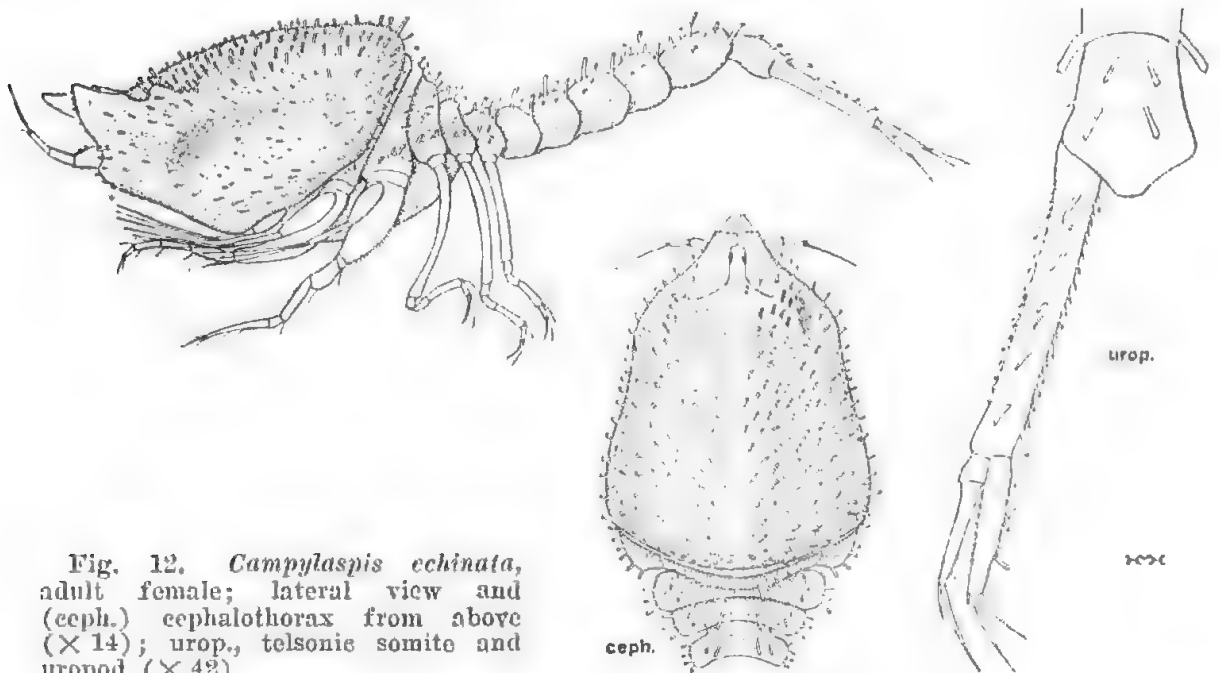


Fig. 12. *Campylaspis echinata*, adult female; lateral view and (ceph.) cephalothorax from above ($\times 14$); urop., telsonic somite and uropod ($\times 42$).

Carapace twice as long as pedigerous somites together, one and three-fourths times as long as deep, and more than one-third as wide again as deep (it is less depressed in the male). Antennal notch shallow and antennal angle rounded. Pseudorostral lobes widely truncate in front and meeting for a distance equal to width of ocular lobe, which is fully twice as long as wide, very slightly narrower than in male.

First pedigerous somite, except for pleural parts, exposed only as a narrow strip.

Pleon a little shorter than carapace (slightly longer than carapace in male); the fourth, fifth and telsonic somites each bear a fine median longitudinal carina on the dorsum.

Basis of third to fifth peracopods very elongate, in all distinctly longer than remaining joints together.

Peduncle of uropod barely twice as long as telsonic somite and about two and one-third times as long as endopod, which is barely longer than exopod; in the male the endopod and peduncle are relatively a little longer.

Colour yellow. Length 4.6 mm.

Loc. New South Wales: Ulladulla, Brush Island, 45 fathoms, in fine silt on flathead grounds (D. Rochford, A. trawl, Jan. 1945).

SUMMARY

The Nannastacids dealt with are mostly from Western Australia, for which fourteen species are listed, including four which are new, *viz.* *Nannastacus nichollsi*, *N. vietus*, *Schizotrema leopardina* and *S. resima*.

Cumellopsis australiensis sp. nov. is described from New South Wales and details are given of the hitherto unknown female of *Campylaspis echinata* Hale.

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THE LIFE CYCLE OF THE TREMATODE ECHINOPARYPHIUM ELLISI, FROM THE BLACK SWAN

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Summary

The larval stage, *Cercaria ellisi* Johnston and Simpson (1944, 125-128), was described from *Lymnaea lessoni* from the Murray River Swamps at Tailem Bend. It was reported to have been indentified on twelve occasions between May 1937 and March 1943, the months being those of autumn, spring and summer. On those occasions, the parasite was found in 156 of 2,064 *Lymnaea* examined, i.e. in 7.5 p.c., but these figures do not take into consideration the numbers of that species of pond snail collected from the swamps on other occasions when *C. ellisi* was not recognized. Since those observations were made we have identified the cercaria in 561 of 2463 *L. lessoni*, i.e. in about 23 p.c., but this increase in percentage was due to collections made on three successive occasions, January to April 1947, 32 of 291 being parasitized in January, 210 of 363 in March, and 197 of 507 in April, a total of 439 out of 1,161 snails examined, i.e. about 38 p.c. On other occasions we found only one of 342 and 4 of 365 infected.